

# APPENDIX A

## National and State Sample Descriptions

The national and regional results presented in this report are based on nationally representative probability samples of fourth-, eighth-, and twelfth-grade students. The samples were selected using a complex multistage sampling design involving the sampling of students from selected schools within selected geographic areas across the country. The sample design had the following stages:

- 1) selection of geographic areas (counties or groups of counties);
- 2) selection of schools (both public and nonpublic) within the selected areas; and
- 3) selection of students within selected schools.

Each selected school that participated in the assessment, and each student assessed, represents a portion of the population of interest. To make valid inferences from the student samples to the respective populations from which they were drawn, sampling weights are needed. Sampling weights are required to account for disproportionate representation due to oversampling of students attending schools with a high concentration of Black and/or Hispanic students and oversampling of students attending nonpublic schools. Lower sampling rates for very small schools must also be accounted for with the sampling weights.

Table A.1 provides a summary of the weighted and unweighted student sample sizes for the national reading assessment. The numbers reported include both public and nonpublic school students.

The results of the 1994 Trial State Assessment Program provided in the report are based on state-level samples of fourth-grade public school students. The samples were selected based on a two-stage sample design — selection of schools within participating states and selection of students within schools. The first-stage samples of schools were selected with probability proportional to the fourth-grade enrollment in the schools. Special procedures were used for states with many small schools and for jurisdictions having a small number of schools.

As with the national samples, the state samples were weighted to allow for valid inferences back to the populations of interest. Table A.2 contains the unweighted

number of participating schools and students as well as weighted school and student participation rates. Two weighted school participation rates are provided for each jurisdiction. The first is the weighted percentage of schools participating in the assessment **before** substitution. This rate is based only on those schools that were initially selected for the assessment. The numerator of this rate is the sum of the number of students represented by each initially selected school that participated in the assessment. The denominator is the sum of the number of students represented by each of the initially selected schools found to have eligible students enrolled. This included both participating and nonparticipating schools.

The second school participation rate is the weighted participation rate after substitution. The numerator of this rate is the sum of the number of students represented by each of the participating schools, whether originally selected or a substitute. The denominator is the same as that for the weighted participation rate for the initial sample. This means, for a given jurisdiction, the weighted participation rate after substitution is always at least as great as the weighted participation rate before substitutions.

Also presented in Table A.2 are the weighted percentages of students participating after make-up sessions. This rate provides the percentage of the eligible student population from participating schools within the jurisdiction that are represented by the students who participated in the assessment (in either an initial session or a make-up session). The numerator of this rate is the sum, across all assessed students, of the number of students represented by each assessed student. The denominator is the sum of the number of students represented by each selected student who was invited and eligible to participate, including students who did not participate.

In carrying out the 1994 Trial State Assessment, the National Center for Education Statistics established participation rate standards that jurisdictions were required to meet in order for their results to be reported (see footnoted jurisdictions in Table A.2). Additional standards were also established that required the annotation of published results for jurisdictions whose sample participation rates were low enough to raise concerns about their representativeness. Two states, Idaho and Michigan, failed to meet the initial school participation rate of 70 percent. For these two states, results for the fourth-grade public school students are not reported in this or any report of 1994 NAEP findings. Several other jurisdictions for which results are published are flagged to note the potential for non-response bias associated with school-level non-response.

NCES standards specify weighted school participation rates of at least 85 percent to guard against potential bias due to school non-response. Six states (Nebraska, New Hampshire, Pennsylvania, Rhode Island, Tennessee, and Wisconsin) failed to meet the following NCES guideline:

**A jurisdiction will receive a notation if its weighted participation rate for the initial sample of public schools was below 85 percent AND the weighted public school participation rate after substitution was below 90 percent.**

For jurisdictions that did not use substitute schools, the participation rates were based on participating schools from the original sample. The first part of this guideline, referring to the weighted school participation rate for the initial sample of schools, is in direct accordance with NCES standards. To help ensure adequate sample representation for each jurisdiction participating in the 1994 Trial State Assessment Program, NAEP provided substitutes for nonparticipating public schools. When possible, a substitute school was provided for each initially selected school that declined participation before November 15, 1993. For jurisdictions that used substitute schools, the assessment results were based on the student data from all schools participating from both the original sample and the list of substitutes (unless both an initial school and its substitute eventually participated, in which case only the data from the initial school were used). The NCES standards do not explicitly address the use of substitute schools to replace initially selected schools that decide not to participate in the assessment. However, considerable technical consideration was given to this issue. Even though the characteristics of the substitute schools were matched as closely as possible to the characteristics of the initially selected schools, substitution does not entirely eliminate bias due to the nonparticipation of initially selected schools. Thus, for the

weighted school participation rates including substitute schools, the guideline was set at 90 percent.

The NCES standards specify that attention should be given to the representativeness of the sample coverage. Thus, if some important segment of the jurisdiction's population was not adequately represented, it was of concern, regardless of the overall participation rate. One state, Montana, failed to meet the following NCES guideline concerning strata-specific participation rates.

**A jurisdiction with otherwise adequate weighted public school participation will receive a notation if the nonparticipating public schools included a class of schools with similar characteristics, which together accounted for more than five percent of the jurisdiction's total fourth-grade weighted sample of public schools. The classes of schools from each of which a jurisdiction needed minimum school participation levels were by degree of urbanization, minority enrollment, and median household income of the area in which the school is located.**

This guideline addresses the fact that, if nonparticipating schools were concentrated within a particular class of schools, the potential for substantial bias remained, even if the overall level of school participation appeared to be satisfactory. Non-response adjustment cells for public schools were formed within each jurisdiction, and the schools within each cell were similar with respect to minority enrollment, degree of urbanization, and/or median household income, as appropriate for each jurisdiction. If more than five percent (weighted) of the sample schools (after substitution) were nonparticipants from a single adjustment cell, then the potential for non-response bias was too great. This guideline was based on the NCES standard for strata-specific school non-response rates.

**Table A.1** Unweighted and Weighted Sample Size by Grade for the 1994 Assessment in Reading, Public and Nonpublic Schools

Unweighted Sample Size (and Percent of Total)			
	Grade 4	Grade 8	Grade 12
<b>Nation</b>	7382 (100.0%)	10,135 (100.0%)	9,935 (100.0%)
<b>Region</b>			
Northeast	1816 ( 24.6%)	1918 ( 18.9%)	2289 ( 23.0%)
Southeast	1888 ( 25.6%)	3132 ( 30.9%)	2777 ( 28.0%)
Central	1571 ( 21.3%)	2149 ( 21.2%)	2005 ( 20.2%)
West	2107 ( 28.6%)	2936 ( 29.0%)	2864 ( 28.8%)
Weighted Sample Size (and Percent of Total)			
	Grade 4	Grade 8	Grade 12
<b>Nation</b>	3,527,410 (100.0%)	2,245,276 (100.0%)	1,811,014 (100.0%)
<b>Region</b>			
Northeast	800,903 ( 22.7%)	459,134 ( 20.5%)	366,999 ( 20.3%)
Southeast	826,167 ( 23.4%)	581,039 ( 25.9%)	423,235 ( 23.4%)
Central	870,268 ( 24.7%)	542,615 ( 24.2%)	488,863 ( 27.0%)
West	1,030,072 ( 29.2%)	662,489 ( 29.5%)	531,917 ( 29.4%)

Percentages may not total 100 percent due to rounding.

Source: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1992 and 1994 Reading Assessments

**Table A.2** School and Student Participation Rates by State for the 1994 Trial State Assessment, Grade 4, Public Schools Only

	Weighted Percentage School Participation Before Substitution	Weighted Percentage School Participation After Substitution	Total Number of Schools That Participated	Weighted Percentage Student Participation After Make-ups	Total Number of Students Assessed
<b>Nation</b>	86	87	227	95	6,030
<b>Region</b>					
Northeast	93	93	49	94	1,367
Southeast	91	93	61	95	1,649
Central	85	87	52	95	1,184
West	77	77	65	95	1,830
<b>States</b>					
Alabama	87	93	99	96	2,646
Arizona	99	99	104	94	2,651
Arkansas	86	94	97	96	2,535
California	80	91	97	94	2,252
Colorado	100	100	108	94	2,730
Connecticut	96	96	101	96	2,577
Delaware	100	100	51	96	2,239
Florida	100	100	107	94	2,666
Georgia	99	99	105	95	2,766
Hawaii	99	99	104	95	2,732
Idaho <sup>1</sup>	69	91	98	96	2,598
Indiana	83	92	100	96	2,655
Iowa	85	99	107	96	2,759
Kentucky	88	96	101	97	2,758
Louisiana	100	100	103	96	2,713
Maine	94	97	104	94	2,436
Maryland	94	96	100	95	2,555
Massachusetts	97	97	99	95	2,517
Michigan <sup>1</sup>	63	80	83	95	2,142
Minnesota	86	95	100	95	2,655
Mississippi	95	99	103	97	2,762
Missouri	96	98	105	95	2,670
Montana <sup>3</sup>	85	89	111	96	2,501
Nebraska <sup>2</sup>	71	77	109	95	2,395
New Hampshire <sup>2</sup>	71	79	86	96	2,197
New Jersey	85	91	96	95	2,509
New Mexico	100	100	105	95	2,635
New York	75	91	96	95	2,495
North Carolina	99	99	105	96	2,832
North Dakota	80	91	117	97	2,544
Pennsylvania <sup>2</sup>	80	84	89	94	2,290
Rhode Island <sup>2</sup>	80	86	92	95	2,341
South Carolina	95	97	102	96	2,707
Tennessee <sup>2</sup>	72	74	76	96	1,998
Texas	91	93	98	96	2,454
Utah	100	100	105	95	2,733
Virginia	98	99	105	95	2,719
Washington	100	100	104	94	2,737
West Virginia	99	100	111	96	2,757
Wisconsin <sup>2</sup>	79	86	91	96	2,331
Wyoming	98	98	112	96	2,699
<b>Other Jurisdictions</b>					
DoDEA	99	99	81	95	2,413
Guam	100	100	21	96	2,203

<sup>1</sup> State's public-school weighted participation rate for the initial sample was less than 70 percent. NCES reporting guidelines prohibit the reporting of results for these two states.

<sup>2</sup> The state's public-school weighted participation rate for the initial sample of schools was below 85 percent AND the weighted school participation rate after substitution was below 90 percent.

<sup>3</sup> The nonparticipating public schools included a class of schools with similar characteristics, which together account for more than five percent of the state's total fourth-grade weighted sample of public schools.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1992 and 1994 Reading Assessments